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ABSTRACT

Twenty programs about conservation and forest fire prevention were telecast to kindergarten and first-grade children. The programs, each 20 minutes long, were especially prepared for that age group. Testing of experimental and control groups showed that the telecasts were outstandingly successful in teaching concepts about those subjects, particularly to first graders. Although minor difficulties were encountered in broadcast reception and in having suitable situations or equipment for the viewing time, the series met with general approval from teachers and administrators. Classroom teachers felt that the technical production was not up to commercial television quality and that the television teacher presented the material well but should have supplemented her lectures with other types of material. (JK)

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A STUDY OF THE EFFECTIVENESS OF TELEVISION TEACHING OF CONSERVATION
AND FOREST FIRE PREVENTION IN KINDERGARTEN AND FIRST GRADE OF
SELECTED SCHOOLS IN NORTHERN CALIFORNIA: 1969-1970

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INTRODUCTION

During the period 1967-1968 Chico State College conducted for the United States Forest Service and the California State Division of Forestry a study relative to conservation and forest fire prevention education for grades kindergarten, first, second and third. The study involved the use of prepared lesson plans and accompanying laboratory equipment for each classroom. The research was conducted in Butte County, California using a conventional experimental-control design. The results were impressive in their significance for planned instruction of conservation and fire prevention concepts.

The cost factor per classroom caused the investigators to consider alternate forms of instruction to accomplish the same task. Instructional television was carefully examined and thought to be a feasible way of reaching a greater number of children at less expense per child.

The previous study mentioned above, in which instructional classroom and "learning activity packages" formed the basis of instruction, was conducted in Butte County, California. Because of the range and power of open channel television, it was decided to enlarge the experimental base for this phase of the research to include three counties. These counties were Butte, Shasta, and Modoc, which are all located north of Sacramento and stretch to the Oregon border.

It was the objective of this investigation to test a specifically designed instructional television sequence in conservation and fire prevention within the normal instructional format using the broadcast resources of an educational television station in Northern California (KIXE (9), Redding).

REVIEW OF THE LITERATURE

A survey of the existing literature seems in general to say that the teaching of subject matter material by television is as successful as regular classroom instruction. Most studies indicate various limitations as to the superiority of television instruction per se. A midwest program using airborne television instruction verified the above findings. This study which ranged over a period of ten years has accumulated statistical data which seems to indicate that the pioneers in instructional television had found at least an equally effective alternate to regular classroom instruction.¹

Phillip Lewis, in writing in the Educational Television Guidebook, presents the view that television has the power to create intimacy, instantaneousness and versatility for the viewer. He closes his analysis of television today with the comment that the extent to which television can be profitably utilized in education is limited only by the ability, creativity and resourcefulness of the user.²

In a study conducted in the Wayne, Michigan community schools, the researchers encountered problems such as seating arrangement, lighting glare and obtaining programs suitable to the needs of the students. In a questionnaire relative to the attitudes toward the experiment, all of the teachers said the program should continue,

¹Mary Howard Smith (ed.), Using TV in the Classroom, Midwest Program on Airborne TV Instruction (New York: McGraw-Hill Book Company, 1961).

²Phillip Lewis, Educational TV Guidebook. (New York: McGraw Hill Book Company, 1961) pp. 7, 10.

3

ninety percent of the pupils would like it continued, and the parents generally were also favorable.³

In work conducted by the United Nations on the education of women, a study was reported which took place at Dakar. The purpose of the study was to find if television could be used effectively to give practical knowledge in helping modernize their country. The results of the study indicated that among the inexperienced with television, the audience seemed to acquire knowledge by dialectical processes rather than mechanical conditioning and discussions immediately following the programs were of decisive importance in how well the material was retained.⁴

An additional research progress in metropolitan community educational television took place in western Pennsylvania in 1962. It was found that the public schools responded very much in favor of the project and desired to have it continue. At the time of the study, twenty percent of all children were viewing some form of instructional television in the school system.⁵

In discussing the role of television production the National Association of Educational Broadcasters indicated that one must be always aware of the technique of production as it relates to the communicative process centered around an emphasis on the subject

³Community School District. Wayne, Michigan. A School System Looks at Instructional Television: Wayne Community Schools. (Michigan: Michigan Audio-Visual Association, 1963) p. 11.

⁴Pierce Fougere, Television and the Social Education of Women. (France: Workshops of the U.N. Educational, Scientific and Cultural Organization, 1967), p. 9.

⁵Clarence Walter Stone (ed.), A Report on Development of Instructional TV Services in Western Pennsylvania. (Pennsylvania: Graduate Library School of the University of Pittsburgh, 1964).

and control of the subject.⁶

George Gordon, in discussing educational television in 1965, indicated that there is no single successful teaching method or technique for exclusive television usage. He indicates that most instructional television has closely followed ordinary classroom procedures. The traditional classroom replicated for presentation over television has limited the scope and appeal of lessons. He indicated that instructional broadcasters have been criticized for being too dependent upon the techniques of commercial television producers, and this has cost something in the way of poorer communication. The passive nature of the television medium, according to Gordon, has led many broadcasters to forget that television has an enormous capacity to militate against passiveness in the viewer. He felt that television offered a powerful device for allowing opposing points of view and multiple facets of evidence to be presented to the student so that he may draw his own conclusions and be stimulated for further research.⁷

⁶L. P. Greenhill and others, The Role of Production in Televised Instruction. (Pennsylvania State University, 1959), pp. 9-10.

⁷George N. Gordon, Educational TV. (New York: New York Center for Applied Research in Education, 1965), pp. 67-68.

Any discussion today of the review of literature regarding instructional television is incomplete without the contemporary realities of (1) the impact of such a writer as Marshall McLuhan, (2) the impact of the new second generation portable television equipment, and (3) the reality of the success of such programs as Sesame Street. Marshall McLuhan has made an impact on the educational world with his analysis of television being a medium which causes the person viewing it to become absorbed and involved quite differently from that of passively viewing a movie. The implications of McLuhan's thoughts are indeed in need of consideration because for most observers there is considerable empirical day-to-day verification of his concepts. The implication for McLuhan-type thoughts on the electronic age are that conventional instructional process can be dramatically improved without threatening the role of the teacher. In fact, as the electronic age evolves, the role of the teacher increases as she gains skill in the use of the various media as instructional tools.

The appearance of what is termed second generation portable television equipment essentially means that hand-held television cameras, hand-carried television recorders and play-back units are now reasonably priced and easily available to all school systems. Essentially, this means that the exotic element of television equipment which was once a part of its romance has virtually disappeared. This also means that instructional television, especially of the closed circuit variety, can be implemented by any educational unit that wishes to do so with little excuse rationale available to them. In fact, as the review of this literature progressed through library

holdings it became increasingly obvious that the hallmarks of the older studies of electronic media and their implementation into school systems are now in the category of ancient history simply because of the propulsion of media into the school scene by increased excellence and reduced costs.

If one thinks that the movement of educational media is dramatically toward instructional television by a nearly exclusive use of small compact low cost units, one could be easily mistaken. The National Educational Television Network has been broadcasting this academic year the very successful program Sesame Street. Sesame Street's success has been virtually assured at this point. The magic of this success is principally due to excellent financing and high quality talent. If there is any message in what has happened to the Sesame Street success story it is that if the American public and institutions want to have successful educational television, they can have it if they are willing to pay for it. This brings all of those interested in pursuing the educational television scene to realize that it is in the final analysis a matter of priorities. The days of the "magic" of teachers needing to stand close to children is not as imperative as it once was as long as there is a mix of some physical closeness of the teacher as well as the use of visual media to supplement classroom instruction. In essence, the successful instructor can easily have a blend of the two and satisfy most field experienced teachers as to the merit of the instruction.

Lawrence Costello and George Gordon, in their work Teach with Television, A Guide to Instructional TV, have stated that closed circuit television systems hold out in many instances possibilities

more practical to meet the needs of large numbers of schools, colleges and school systems than regular standard broadcasts. They also indicate that equally important as the above observation may be, without a clarity of education philosophy and a firmness on the part of school people regarding television it easily becomes just another gadget in the program. As a part of the total picture of instruction television should not be underestimated when it is used properly.⁸

A study made by Stone covering 100 projects indicates that students can and do learn efficiently from instructional television. The important aspect of Stone's work is his consistent finding that those who feared instructional television as a personal competitor to the teacher have found this threat to be nonexistent. In cases where such feelings do still exist, they are felt less following more direct exposure to the medium and its values. The resistance is known to quickly dissolve under positive conditions. This study indicated a high recommendation for incorporating instructional television into the mainstream of library services.⁹

Again it must be realized that no present day consideration of educational television for children can escape the impact of Sesame Street. As previously mentioned, this current (1970) production over regular educational channels has caught fire in the public's eye and has shown the potential for well-financed educational television programs. The series that has used the best of educational

⁸Lawrence Costello and George Gordon, Teach with Television, A Guide to Instructional TV. (New York: Hastings House Publishers, 1961) pp. 172-173.

⁹Clarence Walter Stone (ed.), A Report on Development of Instructional TV Services in Western Pennsylvania. (Pittsburg, Penn.: Graduate Library School of the University of Pittsburg, 1964) p. 5.

personnel resources, as well as professional actors, actresses and commercially oriented people for projects in animation. If one were to empirically evaluate the worth of Sesame Street it would be that this series of programs proves to all of those in America who wonder about the potential of educational television that indeed there is an opportunity for excellence if there is a willingness to plan and finance. Several years ago in 1953 Jennie Callahan, in writing about television in schools and colleges, indicated that as far back as 1953 the interest of the Association for Childhood Education was in the uses of television in early childhood education. She reports on an early study done at the Hunter College Elementary School. At that time the greatest benefit of the research seemed to be an enlightenment of the problems which would lie ahead for those interested in doing their best to bring about the future use of television as a teaching tool.¹⁰

Fletcher, writing in 1958, indicated that television has a very unique quality in permitting the extending of the influence and magnifying the effectiveness of the gifted teacher. Using both open channel and closed circuit television, the gifted teacher can reach larger and larger numbers of students in economical fashion. Also by new portable equipment it would be possible to reach the home-bound child with talents of the gifted teacher. The same advantages could be given to home-bound adults, particularly as we move into a larger geriatric society.¹¹

¹⁰Jennie Callahan, Television in School, College and Community. (New York: McGraw-Hill Book Company, 1953) p. XIII.

¹¹Leon C. Fletcher, TV New Engagement, Showmanship and Scholarship, An Up-to-Date Report on Educational TV. (San Francisco: Fearson Publishers, 1958) p. 33.

The Stanford University Institute for Communications Research conducted a study on the problems and potentials of educational television and found that teachers' attitudes toward instructional television were predictable and that most teachers would come to like television in the classroom. Those who did not care for television tended to be suspicious and resistant, but the opposition usually faded particularly in the case of elementary teachers. The elementary teachers almost one hundred percent came to like and depend on television as one part of their teaching resources when given the opportunity for adequate exposure to television resources. In a study conducted at Hagerstown where extensive closed circuit instructional television had been incorporated, teachers were asked whether they would prefer to teach the class they are now teaching with or without television and eighty-three percent indicated a strong preference for the use of television. High school teachers in the same community using similar television resources seemed to be a shade less favorable to television. In Detroit, at about the same time, a similar study indicated Detroit teachers were favorable to the use of instructional television in the classroom. A statistical study conducted by this same author among teachers using television in four different states indicated that large and significant percentages of the teachers using television believed from their classroom experience that students did indeed learn more while having an extended exposure to the incorporation of educational television in the classroom.¹²

¹²

Stanford University, Institute for Communications Research, Educational Television, The Next Ten Years. (California: Stanford University, Institute for Communications Research, 1962), p. 59.

In a report by the Ford Foundation in 1959 they indicated results of a survey on television in Alabama, where educational costs are extremely low, showed that 300,000 children in 600 elementary and secondary schools throughout the state were receiving educational television programs. These programs were a compromise to bring quality education into schools which traditionally have had a history of inadequate financing. The study also reported a summary of findings which were done at Pennsylvania State University dealing with comparative effectiveness of television in instruction. It was generally found that there was no significant difference in achievement between college students taught with closed circuit television and those who were taught in the conventional manner. Also, their testing indicated that there was little difference in course-related attitudes between students who took the course by television and those who took it in the conventional way. There seemed to be a matter of appropriateness. The study indicated that television has its largest strength in allowing excellent instructors to be exposed to larger numbers of students. One of their configurations of usage resulted in the television discussions being followed up by small group meetings under the leadership of graduate students or selected seniors. Also, it was found that two-way communication systems with the live television broadcast were effective. It was also found that magnification systems with the use of television were important. The students showed a seventy-eight percent acceptability of the television courses. Students in television classes tended to rate the television instructor higher than conventional instruction in the class taught by the same instructor. In five courses students were given instruction by television and in face-to-face situations by the same teacher. They were then given a

a choice between the two methods of instruction for the remainder of the semester. On the average students chose television instruction six to four over face-to-face instruction with the same teacher in a large class period.¹³

¹³Ford Foundation, Teaching by TV, A Report from the Ford Foundation and the Fund for the Advancement of Education. (Ford Foundation, 1959), pp. 5-7.

EXPLANATION OF THE RESEARCH DESIGN

This study was designed to meet a specific need for information about the teaching of conservation and forest fire prevention knowledge involving the use of television resources. A "teaching by television" format was used for children in Butte, Shasta and Modoc counties of Northern California.

The experimental design for this study was based on the traditional experimental-control group format. The method of evaluation for the study was the administration of identical pre-tests and post-tests to both groups of children at approximately the same time. The study was conducted during the Fall semester of 1969 with Chico State College being the base of operations.

The selection of Butte, Shasta and Modoc counties as the sites for the study presented a representative base of Northern California communities. Most of the schools in the experiment were generally located in the Chico, Redding and Alturas areas.

The following table illustrates the location of the experimental and control schools that participated in the study.

In the Fall of 1968, Miss Helen Carkin created the scripts for twenty twenty-minute television programs. These programs were built upon similar concepts used during a previous study for grades kindergarten, first, second and third. Because of financial constraints the study was restricted to kindergarten and first grade.

CONTROL SCHOOLS

SIERRA VIEW SCHOOL, Chico

Mrs. Lucille Andrews	Grade 1	25 tested
Mrs. Janet Dalrymple	Grade 1	30 tested

PARKVIEW SCHOOL, Chico

Mrs. Beatrice Findlay	Grade 1	24 tested
Mrs. Vanderlay	Grade 1	30 tested
Mrs. Brasfield	Grade 1	27 tested

HOCKER OAK SCHOOL, Chico

Mrs. Mary Betts	Kindergarten	20 tested
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MARIGOLD SCHOOL, Chico

Mrs. B. Garner	Kindergarten	27 tested
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OAKDALE SCHOOL, Chico

Mrs. Jo Ann Zitlaw	Kindergarten	22 tested
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DURHAM ELEMENTARY SCHOOL, Durham

Mrs. Tilley	Kindergarten	26 tested
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PARADISE ELEMENTARY SCHOOL, Paradise

Mrs. Ernestine Collins	Kindergarten	25 tested
Mrs. Myrtice Smith	Grade 1	27 tested

CITRUS SCHOOL, Chico

Mrs. Charmoin Adams	Grade 1	24 tested
Mrs. Lotys Gibb	Grade 1	26 tested
Mrs. Betty Shea	Grade 1	28 tested

BONNYVIEW SCHOOL, Redding

Mrs. Bertine Rogers	Grade 1	26 tested
Mrs. Shirley Comer	Grade 1	26 tested

JUNIPER SCHOOL, Redding

Mrs. Darlene Blancett	Grade 1	22 tested
Mrs. Sammie Davis	Grade 1	21 tested

CONTROL SCHOOLS (cont.)

MANZANITA SCHOOL, Redding

Mrs. Cleo Neasham	Grade 1	21 tested
Wanda Swanson	Grade 1	17 tested
Mrs. Katherine Haake	Grade 1	19 tested
Miss Edith Wright	Kindergarten	26 tested

CYPRESS SCHOOL, Redding

Barbara O'Conner	Kindergarten	24 tested
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SYCAMORE SCHOOL, Redding

Joy Newell	Kindergarten	23 tested
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NEAL DOW SCHOOL, Chico

Mrs. Winona Wright	Grade 1	27 tested
Mrs. Shirley Crews	Grade 1	26 tested

AJH SCHOOL, Chico

Kindergarten	30 tested
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EXPERIMENTAL SCHOOLS

OAKDALE SCHOOL, Chico

Mrs. Melinda Whyman	Grade 1	24 tested
Mrs. Judy Jacobson	Grade 1	26 tested
Mrs. Jo Ann Zitlaw (also control)	Kindergarten	19 tested

HOOKE OAK SCHOOL, Chico

Mrs. Clara Brown	Grade 1	24 tested
Mrs. Marylib Wallace	Grade 1	22 tested

MARIGOLD SCHOOL, Chico

Mrs. B. Garner (also control)	Kindergarten	21 tested
Mrs. Joyce Pagent	Grade 1	19 tested
Mrs. Nancy Coria	Grade 1	22 tested

DURHAM ELEMENTARY SCHOOL, Durham

Mrs. Tilley (also control)	Kindergarten	20 tested
Mrs. Pat Braly	Grade 1	28 tested
Mrs. Luallen	Grade 1	28 tested

PONDEROSA ELEMENTARY SCHOOL, Paradise

Mrs. Elizabeth Ferrell	Grade 1	26 tested
Mrs. Enid Van Asperen	Kindergarten	21 tested

CYPRESS SCHOOL, Redding

Mrs. Linda Rea	Grade 1	26 tested
Mrs. Joeline Henriques	Grade 1	29 tested
Barbara O'Connor (also control)	Kindergarten	20 tested

SYCAMORE SCHOOL, Redding

Joy Newell (also control)	Kindergarten	17 tested
Mrs. Marguerite Selden	Grade 1	25 tested
Mrs. Edith Whitaker	Grade 1	27 tested
Mrs. Yvonne Cain	Grade 1	29 tested

MAGNOLIA SCHOOL, Redding

Mrs. S. Riley	Grade 1	27 tested
Miss King	Grade 1	25 tested
Mrs. Johnson	Kindergarten	30 tested

SHASTA ELEMENTARY SCHOOL, Chico

Mrs. Pettigrew	Grade 1	27 tested
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EXPERIMENTAL SCHOOLS (cont.)

AJH SCHOOL, Chico

Grade 1-2 53 tested

Mrs. E. Fregarthen

Mrs. B. Elliot

Mrs. Ilene Gottman

30 tested

MODOC COUNTY

Mary Trechter

Kindergarten 30 tested

Mary Trechter

Grade 1 30 tested

In order for the television programs created by Miss Carkin to be as effective as possible, there was introduced into the instructional framework, an emphasis on forest fire prevention and its destruction. Also, there was an increased emphasis on the dangers of residential fire hazards, preventative measures and uses of emergency procedures.

The titles of the twenty-twenty minute programs which are presented in the table below indicate the nature of the conservation and fire prevention lessons presented in the television programs.

TABLE OF TELEVISION PROGRAMS

1	Conservation and Forest Fire Prevention
2	Timber Production
3	Watershed
4	Wildlife Habitat
5	Range Grazing
6	Recreation
7	Forestry Laws - Signs - and Fire Permits
8	The Proper Use of the Incinerator
9	Places to Build Fires
10	Leave a Clean Camp and A Dead Fire
11	Fireworks
12	Tree Seeds
13	Seedlings and How They Are Planted
14	Needles and Leaves
15	How Water Helps Prevent Forest Fires
16	The Effect of Wind on Fire
17	Temperature

- 18 My Use For A Tree
- 19 Telephone Emergency Usage
- 20 I Will Protect Trees

The independent role assigned to the television teacher in the early stages of the research design discussions, was considered by the researchers to limit the involvement of the classroom teacher because of the extreme variability of teacher participation encountered in the previous study. It was found that the range of teacher support and contribution to the research ideal was from "less than enthusiastic" to "overly enthusiastic" to the point where some teachers were altering the instructional materials in order to "make them better."

The production of the television programs took place at the Chico State College Television Services studio during the Spring of 1969. An effort was made to create a "forest setting" by the use of fresh fir boughs and the use of a rearview screen for varying landscape effects. Miss Carkin wore a simple dress to simulate the appearance of a uniform which represented typical state or federal women's apparel.

The television programs were recorded on 2-inch helical scan video tape using two alternating cameras. Extensive use was made of supportive visual aids such as close-ups of posters actually handled by the television teachers. Slide scenes were projected directly on to the video receiver as well as 16MM film footage belonging to the United States Forest Service of fire scenes.

The programs were transferred to quadruplex scan tape for broadcast over Channel 9, KIXE, Redding, California over open channel

television. The broadcasting started October 1, 1969 and ended October 28, 1969 after the twenty programs had been presented. On October 29th, one program was re-broadcast because of an inadvertent delay in broadcast time.

The broadcast time was 12:30 to 1:00 P.M. For some schools this proved to be a hardship, for others it was an opportune time to view the programs. It was most disadvantageous to single session kindergartens which caused a disproportionate number of first grades to participate in the experimental aspect of the study. Schools were often pressed to assemble youngsters in reasonable and sometimes unreasonable areas for the viewing the programs. The general plan was to walk the children from their classroom to some collective point where a television set or sets were available.

The limitations of equipment within schools prevented what would seem to be "reasonableness" in television viewing, i.e., that the children would view the programs in their own rooms. It was obvious that the electronic media had been used mostly for upper grades and rarely at the primary level in many schools. The stimulation of the experience was welcomed by the teachers.

TESTING PROGRAM

The testing program consisted of the administration of individual tests to each child participating in the study. The tests were designed to be administered by a test administrator. Each test took approximately seven minutes to administer. There were no right or wrong answers to the test items. Each item reflected three levels of choice. Each test question by each grade level offered consistently three choices: a--no answer; b--moderate answer; and c--high level answer. The test for the kindergarten was of a lower conceptual level than the test for the first grade, although each of them paralleled the material presented in the television programs. Samples of the test are located in the Appendix for the reader's examination.

There were three test administrators who conducted all of the testing in the study. This uniform and consistent approach to the testing process was a product of one of the faults encountered during the previous research when the classroom teachers were asked to administer approximately thirty seven minute individualized pre-and post-tests. Although the previous study proved statistically significant for the experimental treatment, the variability of the test administration remained a concern to this investigator.

TEACHER EVALUATION

It was obvious that the use of open-channel television broadcasting whereby all schools received the same programs at the same time caused some hardship to individual teachers. The responsibility of moving children is a routine part of a teacher's day. However, when the reception of the broadcast was of poor quality or late, as in one program, the ill will generated was considerable.

The major criticism heard over and over was that there was too little time for the teachers to "clean-up" after the programs, i.e., putting the books away with the pencils reinserted in the booklet with no post program discussion. The reason that this was of concern to the teachers was that they were told that the programs were self-contained meaning that from start to finish Miss Carkin would be the instructor for this unit.

On this topic the teachers were divided approximately fifty-fifty as to their willingness to permit Miss Carkin to be the sole instructor. Because it was a research project even those teachers who disliked relinquishing total control to the television teacher cooperated. It is estimated that no more than ten to fifteen percent of the teachers "interfered" with the autonomous presentation by supplementing the television lessons with extensive discussions and supplemental classroom materials beyond the programs.

There was modest comment that the technical production was not of commercial television quality. There were complaints that some pictures were not clear enough when projected on the television screen. One consistent complaint was that the time given for the work to be done

by children was much too long during the "hold" patterns. These were five minutes in length.

The teachers were generally supportive of the television teacher's presentation. They stressed their approval of her in-charge attitude. There was a general request for more action in the programs rather than so much "teacher talk."

Lesson Thirteen on Seedlings was generally ineffectual because of an inadvertant printing error on the drawing for Lesson Thirteen. There was no seedling drawing as a part of a configuration of four pictures. The explanation is simple but the difficulty the missing seedling caused was complex. In transporting the glued together plates from the studio to the print shop, the seedling picture came unglued and was lost enroute. Unfortunately its absence was not noticed in time.

The general level of communication between the television teacher and the children was reported as good with the limitations as noted above in technical presentation. As the lessons progressed it took more time for the children to find their places in the workbook. This had not been accounted for, or even anticipated and became a uniform complaint among teachers.

The Chico public schools were involved in a Business Education day when Lesson Sixteen, "The Effect of Wind on Fire," was presented. Many Chico teachers mentioned that they spent a few minutes presenting the lesson to their classes on their own if they had missed it with their classes.

The children seem impressed with the television teacher's activity which revolved around the use of the hands. One of the most successful lessons in terms of classroom teacher impression was the one on tele-

phone emergency usage.

There was a general approval of the series expressed to this investigator by both administrators and teachers. The word spread quickly to other teachers in buildings who asked if they could have the same series programmed into their rooms in the spring on a replay basis.

RESULTS

The nature of the difficulties which surrounded the use of instructional television in the Kindergarten is evidenced by the proportionately smaller number of cases finally tabulated for the Kindergarten group. The control group of 186 children as compared to the experimental group of 132 children was due principally to the broadcast time which proved awkward for Kindergartners. This was especially true for Kindergartners which were on two sessions per day. There was some difficulty with television resources for the experimental group of Kindergartners because television had been only moderately used with this level.

The control group for the First grade which had 396 children equated closely with the final pre-test number of subjects for the experimental First grade of 439 children.

There were in the final treatment of the data 1,153 subjects who took both the pre- and post-tests. Of these, 132 Kindergartners viewed the television programs along with 439 First graders for a total of 571 children. There was an approximate twenty percent loss between the number of children statistically treated and the gross number exposed to the experiment. Among the many reasons was a heavy absenteeism found in the Kindergarten and First grade apparently because of the fact that small children represent young families and there seemed to be considerable dropping in and out of school due to some families arriving and others leaving the community. There was a general rule applied by the test administrator that anyone who had missed five of the twenty programs in the experimental group should not have his test counted. The youngster was, however, given the test in order for him to feel included.

In reporting the Kindergarten treatment of the data, the t-test results showed a significant gain for the Kindergarten experimental group. Eleven of nineteen items showed a significance at the .001 level.

The Kindergarten control group questions that were equally significant to the experimental group were those which related to questions such as "What is a forest?", "Where would you plant a tree?", "Why must we clean around campfires?", and "What happens to seeds?"

Although there is a statistically significant increase in the knowledge gained by the Kindergarten children, the test administrators found the testing of the Kindergarten children difficult. They were inhibited because of vocabulary limitations, shyness and probably a general fear of the test situation.

The results of the t-test for the First grade showed a dramatic success for the television programs that were designed for the First grade. All questions for the experimental group were successful at the .001 level.

For the control group two questions turned out to be significant for the First grade; "What is timber?", and "Tell me some of the things a tree needs so that it can grow."

At this point it should be observed that because of cost considerations only Kindergarten and First grade were included in the study. Beyond this constraint an additional compromise was made which resulted in one set of television programs. These twenty programs were purposely aimed at both Kindergarten and First grade. Therefore it was assumed that some programs would be too easy for upper First graders and too difficult for lower Kindergartners. This assumption seems to be confirmed

by the data.

Analysis of Variance

From the accompanying tables, it will be noted that the results of the F-test of significance correlate closely with the results of the t-tests for the pre- and post-tests. The F-ratios at each grade level for the interaction of the pre- and post-tests remained low and for the most part relatively stable.

As a confirming question for both Kindergarten and First grade there was an inquiry on each test for the pupil to answer in his own words. That question reads as follows:

"I can help protect the forest by...."

The sample responses are recorded in the Appendix. The answers tended to confirm in an empirical way the success of the programs particularly for the first grade. The responses in the Appendix will be found separated into three sections for each grade. Those answers which seem to offer a higher level of conceptualization, a moderate level and a lower level.

There is no question but that this has been a successful experiment. It was predicated upon the previous success of the first experiment and it has been shown that children can learn equally well selected concepts of conservation and forest fire prevention education.

Miss Helen Carkin was able with very limited funds to produce programs of interest and with a variety of conservation and forest fire prevention messages. However, she could have increased the appeal and perhaps the impact with more animation and resource people as instructional aids.

The disadvantages of accepting a single program at a given hour for all schools created programming hardships which go back to the days of radio according to the older and more experienced teachers. The hardships are many and alternate viewing methods should be explored.

It is ~~recommended~~ that individual portable television recorders-players be utilized for such instruction. Suitable prime time often cannot be found for receiving instructional television programs and what is prime for one school is a hardship for another.

It was surprising to this investigator to find how extremely limited the television resources of public schools are. As has previously been mentioned, the programs were viewed under conditions which allowed for little flexibility. For example, on the second day when the program was late in getting on the air, teachers had multiples of children in poor but available places for the viewing. When the program failed to appear some groups of children were returned to their rooms at about the same time the program appeared on the air. This was due to the fact that the viewing area was not suitable for any extended periods of waiting.

It is this investigator's opinion that the successful teaching of the principles herein discussed can be dramatically achieved by: 1. Learning Activity Packages; 2. Closed circuit television or open-channel reception of television programs; 3. Individualized instruction using concepts of programmed instruction and behavioral objective planning; 4. Various types of single concept media.

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APPENDIX

TABLE I

30

TEST OF SIGNIFICANCE FOR PRE-TEST AND POST-TEST
APPLICATIONS--KINDERGARTEN

Item	Experimental			Control		
	Pre-test Mean	Post-test Mean	t	Pre-test Mean	Post-test Mean	t
1	1.38	1.72	3.7833**	1.45	1.72	3.3993**
2	1.09	1.30	3.3820**	1.05	1.05	-.2141
3	1.25	1.39	2.0482*	1.30	1.35	.5495
4	1.13	1.40	4.0391**	1.12	1.20	1.5057
5	1.21	1.29	1.3601	1.25	1.26	.3167
6	1.12	1.06	-1.1292	1.10	1.13	.7060
7						
8	1.15	1.40	4.7635**	1.19	1.32	2.6665**
9						
10	1.12	1.20	1.6310	1.15	1.19	.8395
11	1.20	1.48	3.7343**	1.15	1.24	1.8645
12	1.30	1.38	1.2628	1.32	1.54	3.6106**
13	1.14	1.50	5.2370**	1.15	1.21	1.4863
14	1.70	1.81	2.0605*	1.73	1.79	1.0543
15	1.25	1.63	5.2934**	1.15	1.33	3.3031**
16	1.34	1.76	4.6940**	1.28	1.44	2.6638**
17						
18	1.12	1.28	2.8421**	1.05	1.15	2.7441**
19	1.56	1.71	2.1352*	1.56	1.57	0.0000
20	1.03	1.06	.6349	1.04	1.06	.7224
21	1.25	1.55	3.9989**	1.18	1.17	-.2081
22	1.07	1.43	6.2197**	1.06	1.06	-.3871

Degrees of Freedom: Experimental = 260
Control = 370

*p < .01
**p < .001

TABLE II

31

TEST OF SIGNIFICANCE FOR PRE-TEST AND POST-TEST
APPLICATIONS--FIRST GRADE

Item	Experimental			Control		
	Pre-test Mean	Post-test Mean	t	Pre-test Mean	Post-test Mean	t
1	1.30	1.90	7.348**	1.11	1.34	5.5835**
2	1.05	1.48	5.099**	1.01	1.02	0.000
3	1.03	1.27	4.472**	1.00	1.00	.8324
4	1.21	1.45	5.831**	1.09	1.10	.0899
5	1.10	1.27	4.123**	1.03	1.07	1.8302
6	1.16	1.47	4.796**	1.14	1.18	1.0932
7						
8	1.05	1.13	3.742**	1.00	1.02	1.7981
9	1.12	1.34	4.472**	1.09	1.15	2.3063**
10	1.48	1.69	6.083**	1.41	1.48	1.6220
11						
12	2.11	2.31	7.550**	2.04	2.17	2.6808**
13	1.54	1.69	5.745**	1.47	1.41	-1.8431
14	1.04	1.28	4.123**	1.01	1.01	.4731
15	1.70	1.82	6.325**	1.60	1.62	.2572
16						
17	1.05	1.57	4.359**	1.00	1.01	1.2950
18	1.39	1.68	8.426**	1.28	1.26	-.3612
19	1.50	1.56	5.916**	1.31	1.38	1.5808
20	1.04	1.07	3.000**	1.01	1.02	.4110
21	1.31	1.60	6.403**	1.09	1.14	1.7824
22	1.15	1.75	5.568**	1.16	1.22	1.6686

Degrees of Freedom:

Experimental = 437

Control = 790

*p < .01

**p < .001

TABLE III
EXPERIMENTAL PRE-TEST AND POST-TEST DATA--KINDERGARTEN

Item	Pre-test		Post-test	
	Mean	Standard Deviation	Mean	Standard Deviation
1	1.38	0.66	1.72	0.77
2	1.09	1.36	1.30	0.56
3	1.25	0.51	1.39	0.62
4	1.13	0.36	1.40	0.66
5	1.21	0.50	1.29	0.48
6	1.12	0.40	1.06	0.35
7				
8	1.15	0.36	1.40	0.52
9				
10	1.12	0.34	1.20	0.47
11	1.20	0.45	1.48	0.73
12	1.30	0.47	1.38	0.50
13	1.14	0.35	1.50	0.72
14	1.70	0.47	1.81	0.42
15	1.25	0.48	1.63	0.67
16	1.34	0.60	1.76	0.74
17				
18	1.12	0.38	1.28	0.51
19	1.56	0.55	1.71	0.54
20	1.03	0.26	1.06	0.32
21	1.25	0.49	1.55	0.68
22	1.07	0.26	1.43	0.61

Pre-test: N = 132

Post-test: N = 132

TABLE IV

33

EXPERIMENTAL PRE-TEST AND POST-TEST DATA--FIRST GRADE

Item	Pre-test		Post-test	
	Mean	Standard Deviation	Mean	Standard Deviation
1	1.30	0.56	1.90	0.88
2	1.05	0.25	1.48	0.68
3	1.03	0.21	1.27	0.60
4	1.21	0.51	1.45	0.65
5	1.10	0.32	1.27	0.50
6	1.16	0.40	1.47	0.55
7				
8	1.05	0.26	1.13	0.46
9	1.12	0.34	1.34	0.53
10	1.48	0.57	1.69	0.64
11				
12	2.11	0.61	2.31	0.59
13	1.54	0.54	1.69	0.61
14	1.04	0.24	1.28	0.50
15	1.70	0.61	1.82	0.65
16				
17	1.05	0.27	1.57	0.55
18	1.39	0.75	1.68	0.93
19	1.50	0.59	1.56	0.60
20	1.04	0.25	1.07	0.35
21	1.31	0.60	1.60	0.72
22	1.15	0.39	1.75	0.67

Pre-test: N = 439

Post-test: N = 437

TABLE V
CONTROL PRE-TEST AND POST-TEST DATA--KINDERGARTEN

34

Item	Pre-test		Post-test	
	Mean	Standard Deviation	Mean	Standard Deviation
1	1.45	0.71	1.72	0.83
2	1.05	0.23	1.05	0.25
3	1.30	0.54	1.35	0.58
4	1.12	0.36	1.20	0.53
5	1.25	0.48	1.26	0.50
6	1.10	0.41	1.13	0.46
7				
8	1.19	0.40	1.32	0.49
9				
10	1.15	0.39	1.19	0.47
11	1.15	0.42	1.24	0.57
12	1.32	0.47	1.54	0.55
13	1.15	0.37	1.21	0.46
14	1.73	0.50	1.79	0.48
15	1.15	0.44	1.33	0.58
16	1.28	0.55	1.44	0.64
17				
18	1.05	0.25	1.16	0.44
19	1.56	0.52	1.57	0.53
20	1.04	0.23	1.06	0.33
21	1.18	0.50	1.17	0.48
22	1.06	0.28	1.05	0.25

Pre-test: N = 396

Post-test: N = 394

TABLE VI

CONTROL PRE-TEST AND POST-TEST DATA---FIRST GRADE

Item	Pre-test		Post-test	
	Mean	Standard Deviation	Mean	Standard Deviation
1	1.11	0.37	1.34	0.68
2	1.01	0.12	1.02	0.18
3	1.00	0.05	1.00	0.15
4	1.09	0.39	1.10	0.39
5	1.03	0.20	1.07	0.29
6	1.14	0.36	1.18	0.40
7				
8	1.00	0.07	1.02	0.20
9	1.09	0.30	1.15	0.39
10	1.41	0.55	1.48	0.57
11				
12	2.04	0.57	2.17	0.63
13	1.47	0.52	1.41	0.55
14	1.01	0.10	1.01	0.18
15	1.60	0.55	1.62	0.53
16				
17	1.00	0.05	1.01	0.18
18	1.28	0.69	1.26	0.67
19	1.31	0.50	1.38	0.56
20	1.01	0.13	1.02	0.20
21	1.09	0.31	1.14	0.43
22	1.16	0.46	1.22	0.51

Pre-test: N = 396

Post-test: N = 394

TABLE VII
REPORT OF F-RATIOS OF INDIVIDUAL ANALYSIS OF VARIANCE TREATMENTS
SHOWING SIGNIFICANCE AT THE .05 AND .01 LEVELS FOR EACH OF
THE TWENTY-TWO ITEMS IN KINDERGARTEN

Item	F-ratio Experimental Treatment	F-ratio Interaction of Pre- and post-tests	F-ratio Interaction "E.T." and "I.P.P.T."
1	.19	97.84***	.44
2	21.24***	.90	14.41***
3	.00	2.47	2.05
4	6.47*	2.91	7.38***
5	.01	2.18	.97
6	.68	.06	1.64
7			
8	.20	7.42***	4.80*
9			
10	.08	6.88***	.56
11	9.88***	4.17*	5.53*
12	3.04	5.30*	2.91
13	8.63***	2.01	22.33***
14	.00	7.67***	1.03
15	16.53***	7.15***	7.43***
16	9.21***	5.99*	7.17***
17			
18	7.64	20.37***	.97
19	2.06	1.00	3.30
20	.17	1643.33***	.00
21	20.18***	.87	17.02***
22	38.09***	.89	48.93***

Degrees of Freedom

Between Subjects	316
Experimental Treatment	1
Subjects within groups	315
Within subjects	317
Interaction of pre- and post-tests	1
Interaction of "E.T." and "I.P.P.T."	1
"I.P.P.T." x subjects within groups	315

*p < .05

**p < .01

***p both .01 and .05 significant level.

TABLE VIII

37

REPORT OF F-RATIOS OF INDIVIDUAL ANALYSIS OF VARIANCE TREATMENTS
SHOWING SIGNIFICANCE AT THE .05 AND .01 LEVELS FOR EACH OF
THE TWENTY-TWO ITEMS IN FIRST GRADE

Item	F-ratio Experimental Treatment	F-ratio Interaction of Pre- and post-tests	F-ratio Interaction "E.T." and "I.P.P.T."
1	111.41***	4.72*	42.37***
2	164.20***	1.00	139.07***
33	76.20***	1.13	51.29***
4	73.79***	1.04	29.23***
5	52.43***	2.24	18.31***
6	34.34***	1.49	67.00***
7			
8	25.26***	2.51	7.42***
9	21.66***	2.95	27.85***
10	17.49***	3.38	10.54***
11			
12	9.86***	13.26***	3.40
13	33.27***	.13	19.85***
14	94.88***	1.08	67.82***
15	20.28***	1.39	5.12*
16			
17	311.17***	1.10	274.82***
18	37.43***	.79	22.68***
19	31.85	109.49***	.07
20	8.84***	2.11	.95
21	125.80***	1.93	29.14***
22	78.97***	1.47	154.18***

Degrees of Freedom

Between Subjects	831
Experimental treatment	1
Subjects within groups	830
Within subjects	832
Interaction of pre- and post-tests	1
Interaction of "E.T." and "I.P.P.T."	1
"I.P.P.T." x subjects within groups	830

*p < .05

**p < .01

***p both .01 and .05 significant level.

ADDENDUM

The responses reported in Tables IX through XX (pages 38-50) contain randomly selected quotations from the children who participated in the study and answered Question #23 on the Post-Test for Kindergarten and Grade One (Copies of the tests are contained in the Appendix).

Question #23 stated: "I can help protect the forest by..."

The children's responses were separated into three roughly sorted stacks as to completeness or thoughtfulness about the question on the part of the child. These sample quotations are offered only to illustrate the range of the conceptual responses offered by the children.

It should be noted that the quotation "stacks" are presented in the order of:

EXPERIMENTAL GROUP:	High Stack, Average Stack, and Low Stack
CONTROL GROUP:	High Stack, Average Stack, and Low Stack

TABLE IX

TYPICAL COMMENTS FROM KINDERGARTEN EXPERIMENTAL (HIGH STACK)

- *1. Watch out for fires. If there is a fire I can call the rangers.
2. Not destroying it and not starting fires and don't litter it up.
3. Water. We put rocks around the fire, because sticks will make the fire spread. By the Fire Department.
- *4. Don't throw any matches down; keep it all clean.
- *5. Not letting them cut any trees down, no trash and not letting a fire in the forest.
6. Get someone to put the fire out. I'd go get my mommy.
7. Watching it with guards.
8. If I was big, I would drive around the forest in my big airplane and pour water all over it.
9. When you make a fire, don't just leave it there. Put water on it.
10. Don't play with matches or if the forest or an animal is on fire it will burn.
11. Clean the forest because it will look much prettier.
12. If you pour water over a fire, if you see fire on your house call fireman and a lot of other things. Protect trees. Rangers are a lot of help.
13. Pour water on dropped cigarette.
- *14. Letting the fireman help it.
- *15. From dirt and water and red stuff from planes.
16. You could have someone to protect it.
17. People have to run away from it or stamp it out.
18. People who give love.
19. Jehovah likes us to.
- *20. Calling the police.
- *21. Don't let fire in it.
- *22. With a forest ranger.
- *(many answers)

TYPICAL COMMENTS FROM FIRST GRADE EXPERIMENTAL (HIGH STACK)

1. Keeping an eye on the trees.
2. Watering the incinerator so there isn't any fire.
- *3. Telling someone about the fire; calling the operator to call the fire department.
- *4. By throwing trash in the garbage, not lighting matches and throwing in forest.
5. By not rubbing two sticks together to make a fire.
6. When you camp and you make a fire, don't make it on the ground.
7. When you camp, camp where you are supposed to camp. If there is no telephone around, make sure there is a car around.
8. If you see a fire try and put it out-if not find a telephone.
9. Not smoking a cigarette and leaving it there.
- *10. Follow the rules, laws. Tell others not to forget to put out fires and things like that.
11. Water fires and be careful when you go camping.
- *12. If you see people with matches, take them away and give them to their mother and father.
13. Don't climb in trees.
14. Drown out campfires, holding all cigarettes until cold.
- *15. Clean and clear the area.
- *16. Call the fireman, call someone and getting other people that will put the fire out and getting other people that live in the forest out of there.
17. Each time I see a fire put it out or call operator.
- *18. Look for help or call operator.
19. Not making fires too big.
20. Obey the laws, make sure no brush around fire. Put out fire before leaving.
21. Don't cut trees down.
22. Don't go along with kids that want to play with matches. If you see a fire don't try and put it out alone.

Comments (Cont.)

23. Don't climb trees, so you won't break the branches and put up signs.
24. Don't throw matches on the ground whether they are lighted or not.
25. Telling people to keep matches from hot air. I would do it for Smokey the Bear.

*(many answers)

TYPICAL COMMENTS FROM KINDERGARTEN EXPERIMENTAL (AVERAGE STACK)

- *1. Not play with matches.
- *2. Put dirt on it.
- 3. Giving it water and taking care of it.
- *4. The fire station or fire engines get the fire out.
- *5. Cleaning it up.
- *6. Putting out fires.
- 7. Deadened it out.
- 8. Took water and spray it.
- 9. Telling nobody to make a fire.
- 10. Getting my Daddy.
- 11. Get a hose and put it out.
- 12. Get signs and call Smokey the Bear.
- 13. Don't let people burn up.
- 14. Step on cigarettes.
- 15. By not putting it on fire.
- 16. Helping the forest and call the operator.
- 17. I would run down by the fire engine place.
- 18. Call on the phone.
- 19. Put a fence around it and watch it.
- 20. A cop, a dad, nothing what I can do.
- 21. Not cut it down.
- *22. Keep out fires.
- 23. Stay by a fire.
- 24. Get people out of the fire.
- 25. Water trees so leaves won't get dead.
- *(many answers)

TYPICAL COMMENTS FROM FIRST GRADE EXPERIMENTAL (AVERAGE STACK)

- *1. Putting the fire out.
 - *2. Not making fires.
 - 3. Plant seedling.
 - 4. Helping to prevent forest fires.
 - 5. Taking care of the forest and trees.
 - * 6. Tell people not to drop their matches when it's still burning.
 - 7. When there is a fire go get help.
 - 8. Water it and make the grass green.
 - 9. Helping with the forestry up in the hills.
 - 10. If I were a smoke jumper.
 - *11. Not playing with matches.
 - 12. Helping the forest fireman.
 - 13. Calling the police and getting some grownups.
 - *14. Keep garbage picked up.
 - 15. Not chopping and knocking down leaves.
 - *16. Call the fire department.
 - 17. We have to grow up and be a policeman. We have to put out the fire.
 - *18. The rangers.
 - 19. Stay away from fires.
 - 20. Telling bigger kids about the fire.
 - 21. If someone lighted a match I'd call the police.
 - 22. Give it food and water it every day.
 - 23. Don't let bad people go there.
 - 24. Pick up papers.
 - 25. I would go stand by Smokey.
- *(many answers)

TABLE XIII
TYPICAL COMMENTS FROM KINDERGARTEN EXPERIMENTAL (LOW STACK)

- *1. Water
2. Put water on it.
3. Every people come at the forest
- *4. I don't know.
5. With water and stuff.
6. Put water on it.
7. The fire engines or trucks.
8. The fire.
9. Matches.
10. Ask my Mom for money.
11. A cop.
12. The Zoo.
13. I don't know what a forest is.
14. Help me or myself.
15. A high thing up in the air.
16. With the fire chief or the fire department.
17. Help people.
18. Cook for my mama.
- *19. No answer.
20. Getting the hose.
21. Call everybody....help people.
22. Smokey the Bear.
23. Kill the bad animals that would get the people, but don't kill the good animals.
24. Pour water on it.
25. I don't know that one or I don't know why I can.
- *(many answers)

TABLE XV
TYPICAL COMMENTS FROM FIRST GRADE EXPERIMENTAL (LOW STACK)

- *1. Watering it or water or finding water.
- 2. Forest fires.
- *3. No answer.
- 4. By the weather or rain.
- *5. I don't know
- 6. The fire engine truck.
- *7. The ranger.
- *8. Being a fireman or being a ranger.
- 9. Giving food to the animals.
- 10. Smokey or Smokey the Bear or fire.
- 11. The police
- 12. From policemen in case someone is around animals.
- *13. Get some water and put it out.
- 14. Giving it food or feeding the squirrels.
- 15. Making a Christmas tree.
- 16. Help or help the kids.
- 17. The operator.
- 18. I don't know what that is.
- 19. Go home and get some water.
- 20. I don't know what to say to that.
- 21. Going away from it.
- 22. Squirtting it all up so fire won't get there.
- 23. Forestry or not bringing matches.
- 24. Keep the animals from getting dead and stuff or telling men not shoot them.
- 25. Watching for fire.
- *(many answers)

TABLE XV

TYPICAL COMMENTS FROM KINDERGARTEN CONTROL (HIGH STACK)

1. Not starting fires and not going off and letting them burn.
2. Helping plant, be careful with fires.
3. Don't drop matches, don't drop cigarettes.
4. Put out campfires and not play with matches.
5. Don't let forest fires start, put out campfires.
6. Not start a fire and follow Smokey's ABC'S.
7. Learn about the forest. Not to light matches.
8. Not to light matches. If a little boy or girl found some matches and they were playing with them, I'd call someone.
9. Not let a fire start, water it, don't play with matches, put some signs up.
10. Tell people not to play with matches. Tell people not to play with firecrackers. Tell grown-ups not to build fires without rocks around them.
11. Put garbage in garbage can. Don't start forest fires.
12. Not play with matches. Don't hurt animals.
13. Drown the fire with water and dirt.
14. Find a telephone and call the fireman.
15. Put fences around the trees. Put up signs. Keeping the fires clean.
16. God
17. Not starting forest fires.
18. By not throwing matches down and cigarettes.

TABLE XVI
TYPICAL COMMENTS FROM FIRST GRADE CONTROL (HIGH STACK)

- *1. If there is a fire, I can help put it out or I can call the fire department.
 2. Being a member of the fire department or calling the fire department.
 3. The state law.
 4. Not dropping matches and cigarettes and putting out our campfires.
 - *5. Not using matches, not letting children have matches, drowning out your campfires.
 6. Telling people not to start a fire or play with matches.
 7. Help put out fires and stamp out cigarettes.
 - *8. Not chopping down trees.
 9. Telling people to put their fire out after they're finished with it.
 10. Watering the trees and make sure the fire is put out before you go there.
 - *11. Not lighting matches and not letting kids play with matches.
 12. Bringing some water and when you see a fire that isn't very big put some water on it.
 13. When you find some fire just call the fireman.
 14. Watering and calling help and pouring water on the fire-the campfire.
 15. Not being a litterbug and not playing with matches.
 16. Don't get down trees or play with matches.
 17. Helping them keep it not burning and don't do anything wrong that you aren't suppose to do.
 18. Try putting it out and call the department.
- *(many answers)

TABLE XVII
TYPICAL COMMENTS FROM KINDERGARTEN CONTROL (AVERAGE STACK)

1. Call the fire station or get a telephone and call.
2. Put on fire.
3. Not littering it.
4. Cleaning it.
5. Cause there's signs.
6. Get a blanket and put it out.
7. So everyone won't throw matches around-live ones.
8. With water. With gates around it.
9. A forest ranger.
10. Nobody is suppose to have matches.
11. Putting out fires with a bucket of water.
12. Going to the nearest creek.
13. Tell the fire engines to go there's smoke.
14. Not playing with matches.
15. Not burning fires too close and leaving them.
16. Watching everything.
17. Our firemen, get a broom and clean everything out.
18. Get a policeman.
19. The fire engines will put the forest fire out.
20. Fire trucks come and they have spray trucks to get it.
21. The thing is put water all over the place and then if a fire comes it won't burn anything.
22. Not putting in any fires.
23. You put out the fires and keep people away. Put out campfires or get someone else to do it.
24. Keep fires out and not let any animals get killed.
25. Guard it.

TABLE XVIII
TYPICAL COMMENTS FROM FIRST GRADE CONTROL (AVERAGE STACK)

1. Stop kids from playing with matches.
2. A fence.
- *3. Putting forest fires out.
4. I would spray it with red dust.
5. Make sure nobody burns any and don't drop a match.
- *6. Being careful.
- *7. Watch it.
8. Take a bucket of water and spray it on.
9. Telling people not to play around with matches.
10. Tell people about fires.
11. Use a fire alarm.
12. Calling the operator.
13. Calling the fireman.
14. Looking around the forest for anybody who tries to burn it up.
- *15. If I find a fire put it out.
16. No fires and no smoking.
17. Keep it so it can't get fires, give it food and water.
18. If there was fire in the forest I would take our hose and start dishing water out.
- *19. Keep away from matches.
- *20. Keep it green.
21. Not being a litterbug.
22. Helping to tell little kids not to play with matches.
23. Running fast.
- *24. Telling people not to make fires.
25. Drown your campfires.
- *(many answers)

TABLE XIX
TYPICAL COMMENTS FROM KINDERGARTEN CONTROL (LOW STACK)

1. Get some other bears and protect it because Goldilocks would get it.
2. I would hang by my feet. I can protect anybody.
3. A water hole.
4. Keeping the animals away.
5. I'd run.
6. Take the hose along.
7. In New York.
8. Wildlife.
9. I don't know how to do it.
10. You have to go to the squirrels.
11. Sometimes by guns.
12. Don't let people put ashes in.
13. Mountains.
14. Pat water around the trees so fire won't come.
15. Put a deer in it, and a rabbit. With a gun and my dad. Have water there so if there was a fire I could throw it on it. With a fireman.
16. Put up signs and things to guard the tree, or traps to snare so people won't get there.
- *17. I don't know or no answer.
- *18. Water.
19. Nice elephant, drinks water, blow animals away. A rabbit.
- 20.. Call people for help, for someone with broken leg. Call someone to help put out the fire if you can't find a hose. Call people to sweep dust.
21. By woman
22. Taking the leaves away.
23. Call a good guy.
24. Helping the person that found it.
25. By the bear.
- *(many answers)

TABLE XX
TYPICAL COMMENTS FROM FIRST GRADE CONTROL (LOW STACK)

1. Not being lazy or drunk.
2. Mothers
3. The United States.
4. To keep every creature away from tents.
- *5. Water
6. I don't know or no answer.
7. From fire.
8. The ranger
9. The policeman.
10. Taking care of the forest.
11. I don't know what you mean.
- *12. Putting it out by water.
13. Put the fires out.
14. Using water.
15. Help
16. Water and the ranger and Smokey.
17. Dirt
18. Pour sand on it.
- *19. Rain
20. Helping people
21. Smokey
22. The ranger.
23. Help put out fires.
24. With a shovel.
25. Don't have matches.
- *(many answers)

PRE-TEST AND POST-TEST INSTRUMENT (1969)

KINDERGARTEN

Pupil's Name _____
School _____
Teacher _____
Room Number _____

Directions: The following test questions are designed to survey concepts of conservation and forest fire prevention education. The test administrator will administer each test individually. The pupil may be guided in his response if it appears that he is knowledgeable about the concept. However, you should avoid giving the child the answer. On the basis of your experience you will need to make judgments as to the adequacy of the answer. The paraphrased answers under each concept are for your general guidance. There is no time limit. However, previous experience with this instrument indicates approximately 7 to 10 minutes administration time.

Please circle the appropriate response.

1. What is a forest?

1. No answer or unacceptable answer
2. A forest is trees
3. A forest is where there are trees, where animals live, etc.

2. What is watershed?

1. No answer or unacceptable answer
2. A place where water is stored; a lake
3. Lakes, rivers, everywhere that the water comes from in the mountains

3. What is wildlife?

1. No answer or unacceptable answer
2. Animals
3. All of the animals that live in the forest; not tame animals

4. Where do cattle graze?

1. No answer or unacceptable answer
2. In the fields; out in the grass
3. In the forests, the valley, etc., descriptive of area other than "on a farm" Especially word, "RANGE."

5. What do we call a place out of doors where we can have a picnic and stay overnight if we want to?

1. No answer or unacceptable answer
2. A campground
3. A campground, plus State park or National park, -- any enlargement on word, "campground."

6. To whom do all of the State and National Parks belong?
 1. No answer or unacceptable answer
 2. To us
 3. To all of the people in the United States, (or any portion of such answer).
7. Deleted. (All deleted items were used in a previous study and are not presently applicable.)
8. Where can you build a fire in a State park?
 1. No answer or unacceptable answer
 2. Only in a stove; or only in a fireplace. (One not both)
 3. Cites both, or adds to one that you can cook in a portable stove.
9. Deleted.
10. What do we mean by fire danger?
 1. No answer or unacceptable answer
 2. A reversal of words such as, when it is dangerous to have a fire
 3. Any involvement in why it would be dangerous to have a fire; weather, no rain, etc.
11. How can you tell the difference between a green leaf and a dry leaf with your eyes shut?
 1. No answer or unacceptable answer
 2. They feel different, -- then ask, "How?" If answer involves water in any form, accept it, if not mark "1."
 3. If you receive a good answer saying that the water is gone from one leaf, smooth, bends easily, etc.
12. If you were going to plant a tree, tell me why you would plant it in the sun or the shade.
 1. No answer or unacceptable answer
 2. They grow better in the sun
 3. If they continue to tell you that they grow straighter in the sun or that they need sunlight to grow strong.
13. What is a cone?
 1. No answer or unacceptable answer
 2. A physical description of a cone
 3. A cone is where the seeds grow, etc.

14. After pine seeds are planted, what do they need to help them grow?
 1. No answer or unacceptable answer
 2. Water, you have to water them.
 3. Rain, any high level words, plus any planting instructions.
15. What happens to the pine seeds when the cone falls off the tree and bounces on the ground?
 1. No answer or unacceptable answer
 2. The seeds fall out; the seeds get knocked out, etc.
 3. The seeds bounce out, fly all over, fall in holes, go under leaves; any embellishment about what happens after they fall out.
16. Why must we clean the ground around a campfire?
 1. No answer or unacceptable answer
 2. The ground could catch fire; the sticks and leaves could catch fire.
 3. The fire could spread; burn forests, etc.
17. Deleted.
18. Tell me some uses for trees.
 1. No answer or unacceptable answer
 2. Wood, objects made of wood.
 3. Timber; place for animals to live; watershed, etc.
19. Why do we have signs in parks?
 1. No answer or unacceptable answer
 2. To tell us things; they may cite a sign.
 3. To tell us the rules of the park.
20. How are trees protected in a State Park?
 1. No answer or unacceptable answer
 2. By answering that no one can destroy or dig up anything in a State Park.
 3. By answering that there are laws that say that you cannot destroy or dig up anything in a State Park.

21. If you find a fire, what do you do?
1. No answer or unacceptable answer
 2. Run to find someone who can help.
 3. Run to find someone who can help and phone the fire department.
22. In case of a fire, and you cannot find help, how would you use the telephone to get help?
1. No answer or unacceptable answer
 2. Dial zero for the Operator
 3. Dial zero for the Operator and leave the phone off the hook.
23. Complete sentence: To the best of your ability, write down everything that they have to say, until they say they are finished.
- I can help protect the forest by -----

PRE-TEST AND POST-TEST INSTRUMENT (1969)

FIRST

Pupil's Name _____

School _____

Teacher _____

Room Number _____

Directions: The following test questions are designed to survey concepts of conservation and forest fire prevention education. The test administrator will administer each test individually. The pupil may be guided in his response if it appears that he is knowledgeable about the concept. However, you should avoid giving the child the answer. On the basis of your experience you will need to make judgments as to the adequacy of the answer. The paraphrased answers under each concept are for your general guidance. There is no time limit. However, previous experience with this instrument indicates approximately 7 to 10 minutes administration time.

Please circle the appropriate response.

1. What is timber?
 1. No answer or unacceptable answer
 2. Trees
 3. Trees used for lumber
2. Where does rain go after it falls on the ground?
 1. No answer or unacceptable answer
 2. It runs into the rivers and lakes
 3. Involves word, watershed, or gives a good explanation about being in the ground held by soil, etc.
3. What is another name for wildlife habitat?
 1. No answer or unacceptable answer
 2. Where animals live
 3. Where wild animals live in the forest, etc., not tame animals on farms
4. When the range is burned, where do cattle get food?
 1. No answer or unacceptable answer
 2. They have to go somewhere else
 3. They have to go somewhere else or they starve. They come onto farms.
5. How do we know where we can go to fish, camp, or picnic?
 1. No answer or unacceptable answer
 2. By reading signs
 3. By reading signs and use of the word, "law."

6. Who is in charge of taking care of the State and National Parks?
 1. No answer or unacceptable answer
 2. Forest ranger
 3. Forest rangers plus any embellishment of this.
7. Deleted. (All deleted items were used in a previous study and are not presently applicable.)
8. Why do we have National Parks?
 1. No answer or unacceptable answer
 2. To preserve them. To keep them safe, etc.
 3. They are so "beautiful, special, different" that we want to keep them this way forever.
9. How is a National Park protected?
 1. No answer or unacceptable answer
 2. By the rangers
 3. By laws that involve rangers
10. Can you tell me how the rain helps protect the forest?
 1. No answer or unacceptable answer
 2. Puts out fires
 3. Makes everything too wet to burn. Fires can't start.
11. Deleted.
12. Tell me some of the things that a tree needs so that it can grow.
 1. No answer or unacceptable answer
 2. Names one - light, water, food, sunshine, air, rest.
 3. Names two or more.
13. How many pine seeds do you think there are in one cone? How can you tell?
 1. No answer or unacceptable answer
 2. The second half of this question is the important part. Mark "2" for any number answer.
 3. Mark "3" for any answer that there is one seed at the base of every scale on the cone or any part of this answer.

14. What is a seedling?
 1. No answer or unacceptable answer
 2. A little tree
 3. Any full description
15. What do you think is the most important thing to do when you plant a seedling?
 1. No answer or unacceptable answer
 2. Keep it watered
 3. Any description involving handling of roots, how to dig the hole, etc.
16. Deleted.
17. Why must we use an incinerator?
 1. No answer or unacceptable answer
 2. So that sparks can't fly around
 3. Any description using the words safety, safe.
18. When is a campfire out?
 1. No answer or unacceptable answer
 2. When there is no smoke plus any other factor.
 3. When the ground is cool enough to put your hands in it. When it is all covered with water.
19. How do you think you could help other people to be careful of fire in a forest?
 1. No answer or unacceptable answer
 2. Single acceptable answer
 3. Two or more acceptable answers
20. How are trees protected in a State Park?
 1. No answer or unacceptable answer
 2. By answering that no one can destroy or dig up anything in a State Park.
 3. By answering that there are laws that say that you cannot destroy or dig up anything in a State Park.
21. If you find a fire, what do you do?
 1. No answer or unacceptable answer
 2. Run to find someone who can help
 3. Run to find someone who can help and phone the fire department.

22. In case of a fire, and you cannot find help, how would you use the telephone to get help?

1. No answer or unacceptable answer
2. Dial zero for the Operator
3. Dial zero for the Operator and leave the phone off the hook

23. Complete sentence: To the best of your ability, write down everything that they have to say, until they say that they are finished.

I can help protect the forest by -----